

## APPLICATION OF LESSON STUDY WITH A SCIENTIFIC APPROACH: A CASE STUDY OF EARLY CHILDHOOD EDUCATION

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### Abstract

This study aimed to analyze the implementation of a scientific approach for early childhood education in Batanghari Regency. Lesson study is a place for teachers to learn together about the theory and implementation of learning with a scientific approach. A qualitative study with a case study approach was employed to gather the data. By using purposeful sampling, there were two principals, ten teachers, and three resource persons getting involved as participants. Data were collected using observation, interview, and documentation techniques. The data analysis steps included data reduction; data presentation and conclusion drawing were used for data analysis. The findings showed that lesson study can be carried out in order to improve the quality of teaching ECE teachers, by following the four stages; introductory workshop, plan, do, and see.

**Keywords:** early childhood education, lesson study, scientific approach

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### INTRODUCTION

The 2013 curriculum for Early Childhood Education (ECE) requires teachers to make changes in learning. Minister of Education and Culture Regulation No. 146 of 2014 concerning 2013 ECE Curriculum outlines that a scientific approach is used in early childhood learning. Therefore, ECE teachers should be able to plan, implement, and evaluate learning with a scientific approach. The scientific approach encourages children to develop ways of thinking through a series of processes, which include the process of observing, asking questions, gathering information, reasoning, and communicating. The whole process is carried out by using all the senses as well as various sources and learning media. This approach is used when children are involved in playing activities, as well as other activities, such as role playing, literacy or artistic activities (ECE Directorate, 2015). In order to realize ECE teachers who are able to carry out learning with a scientific approach, since 2014, the government and the private sector have implemented education and training programs. The aim is to improve teacher competency so that they are able to solve everyday problems when organizing learning in ECE. Professional organizations, such as Indonesian Kindergarten Teachers' Association (IGTKI), Indonesian Early Childhood Educators and Education Personnel Association (HIMPAUDI), and the Association of Raudhatul Athfal's Teachers (IGRA), have also become an extension of the government in fostering and training the competencies of ECE teachers through Tiered Education and Training, ECE Seminars, and ECE workshops.

However, the results of conventional training have not shown the desired results. From the results of research on 150 ECE Basic Education alumni, only 32.92% applied professional competence and pedagogical competencies obtained during training (Muttaqin, 2011). According to Suma and Pujani (2014), three things cause conventional training to be unable to improve teacher professionalism. First, development is not based on real problems. Second, the result of the training is only knowledge, not applied in class. Finally, after training, the teacher returns to teaching with previous patterns and strategies. Based on a preliminary study, ECE teachers in Batanghari district in 2017 recorded as 1,460 teachers. Their educational qualifications vary

greatly, from elementary school graduates to master's degrees. Only 47.74% are qualified bachelor and master who also vary, educational and non-educational. The various ECE teachers, most of them only received ECE education in a flash. This causes learning in ECE has not been maximized in optimizing children's development. The education and training program conducted by the government and private parties for ECE teachers in Batanghari district only reaches a small proportion of teachers. Various things become factors. First, the training conducted by the government only involves certain teachers and the time is limited. Second, the training carried out independently is quite burdensome because it requires a large fee to be paid. Third, the difficulty of leaving teaching assignments is due to the implementation of training in the district or provincial capital. Finally, the difficulty is to adjust time.

These phenomena require thinking to conduct training which does not interfere with work hours wherever possible. ECE teachers need ongoing coaching without leaving their students. They need to be trained to identify problems and find solutions independently through exchanging ideas with others who are considered competent by taking into account the needs and availability of infrastructure in their respective schools. Efforts to foster teachers on an ongoing basis, without leaving school can be carried out with lesson study. Japan has proven it (Stigler & Hiebert, 1999). In Indonesia, Lesson study has been implemented since 1998 through the IMSTEP (Indonesian Mathematics and Science Teacher Education Project), especially in high schools and colleges. Lesson study is an activity initiated by the teacher to explore learning objectives selected and directed to the needs of students through practice (Chokshi & Fernandez, 2004). Lesson study is a collaborative activity carried out by a group of teachers to improve the performance and quality of learning (Mahmudi, 2009). Lesson studies are still very rarely done in Early Childhood Education. One of the reasons is because ECE does not recognize certain subjects. ECE only recognizes six aspects of development that are integratedly developed through an umbrella theme. However, this situation does not indicate that lesson study cannot be used at ECE level because lesson study is basically very potential to improve the ability of ECE teachers, which will certainly affect the quality of education (Susianna &

Suhandi, 2014). In addition, lesson study can also be used as an effort for coaching after training of early childhood educators through ECE groups (Kartika, 2017). Since lesson study is proven to be able to improve teacher professionalism and is still rarely performed in Early Childhood Education, particularly in Batanghari Regency, Jambi Province, this study was conducted to explore the application of lesson study with a scientific approach to Early Childhood Education in Batanghari District. The research questions are: (1) how is lesson study applied with the scientific approach? (2) What are the barriers and efforts to overcome at two ECE institutions in Batanghari Regency?

## LITERATURE REVIEWS

### Early childhood learning

Early childhood is described as an individual who is experiencing a very rapid process of growth and development (Mulyasa, 2012; Isjoni, 2010). They are in the age range of 0-8 years (Brewer, 2007) or 0-6 years (in Indonesia based on Law Number 20 of 2003 concerning the National Education System). Early childhood is a critical period to form the initial foundation for future life. Early childhood education is a coaching effort carried out through the provision of educational stimuli to help physical and spiritual growth and development so that children have readiness to enter further education (Article 1 paragraph 14 of the SPSN Law). It aims to develop children's potential as early as possible (Santoso, 2011). Educators and parents create positive environment where children explore experiences to know and understand the learning experiences that they get through observing, imitating, and experimenting repeatedly and involving all the potential and intelligence of children (Sujiono, 2011). Children construct their knowledge of their environment because they are born with creative potential (Montessori as cited in Feez, 2010). Children are active learners (Kostelnik, Soederman, & Whiren, 2007). They learn to use their full physical use and all abilities are used as tools to gain knowledge. They need to feel, hold, hear, see and explore. They will not stop until they get knowledge about the form of something, its function and how it can be used. In learning, children always connect their thoughts with activities through exploration, discovering, and learning. Children can learn things more quickly through observation or seeing the behavior of others (Bradekamp and Copple, 1997; Hendrick, 2003 cited in Kostelnik, 2007). Sujiono (2011) said that children find out something by being directly involved or doing direct practice, not only through teacher explanation. They are stimulated to learn their own learning material by allowing them to do, understand, and judge something based on their desires.

Aisyah et al. (2011) say that children learn a lot through themselves, but they often need help to integrate what they learn to create concepts that are more complex. It seems clear that early childhood learning positions teachers as supervisors and mediators. Early childhood learning can be implemented through the BCCT (Beyond Center and Circle Time) approach or the "center and circle time" approach. The center implies that every activity in all centers provided has a central point (center point), all of which refer to the learning objectives (Soendari & Wismiarti, 2010). The center and circle approach focuses on children who with the learning process are centered at the play center and when in a circle using 4 types of scaffolding; (1) the playing environment footing, (2) footing before playing, (3) footing during play, and (4) footing after playing (ECE Directorate, 2006). Whereas, the circle is the time when the educator (teacher/ cadre/ tutor) sits with the child in a circular position to provide a foothold for the child which is done before and after playing (ECE Directorate, 2006). Based on the previous explanation, it can be inferred that the center is one of the learning approaches that can be used in learning with a scientific approach. The use of centers as a learning approach can enable all of the children's senses to explore. Due to the availability of play intensity and density, so that scientific steps can be

optimized, children are involved in play activities (including during science learning activities), as well as other activities, such as playing roles, playing blocks, playing literacy, or doing artistic activities.

### Scientific approach

A scientific approach is a basic concept that inspires or is the background of the formulation of teaching methods by applying scientific characteristics (Musfiqon & Nurdyansyah, 2015). The scientific method is the process of asking and answering questions using a specific set of procedures (Gerde, Schachter & Wasik, 2013). The scientific approach is one of the approaches in building a way of thinking so that children have the ability to reason obtained through the process of observing to communicate the results of their thoughts (Ministry of Education and Culture, 2015). This is based on the thinking of Piaget (2009) which says that children learn by building their own knowledge through the experience they have gained. Vigotsky's theory of social constructivism says that to make a person successful, not only in the context of academic discipline and to foster scientific thinking in children requires social interaction (Vigotsky, 1987). In this case, the environment, including other children or adults and the media, really helps children in learning to enrich children's experiences. A scientific approach is absolutely necessary in early childhood learning. Naturally, Children are scientists. They just need to be given the opportunity to explore using their five senses. They should be filled with curiosity by providing a rich environment to explore and teachers who are competent to answer children's curiosity. Scientific approach is an approach that is appropriate to the way children think.

Furthermore, humans from birth tend to be active, inquisitive, curious and classified as creatures who like to play, showing similarities in readiness to learn and explore (Ryan & Deci, 2000). Children are also interested and motivated to learn the world and have strong intuitions about natural phenomena that occur in their daily lives (French, 2004). The scientific approach is actually based on scientific thinking. The knowledge can be obtained when children explore. The series of events carried out in science activities is the basis of scientific or scientific methods. They provide a high involvement space for children so it is very easy to attract children's interest to learn. That is why learning with a scientific approach is highly recommended in ECE. Scientific stages are observing, asking questions, generalizing hypotheses and predictions, experimenting or trying a hypothesis, and summarizing or analyzing data to illustrate a conclusion (Gelman & Brenneman, 2004). Regulation from Ministry of Education and Culture number 146 of 2014 concerning the ECE curriculum explains that the scientific approach includes the activities of observing, asking questions, gathering information, reasoning, and communicating. The steps used in this study include: observing (observing) that can be done together in or outside the classroom, asking questions which is a process of exploring new knowledge, gathering information, reasoning (associating), and communicating (illustrates a conclusion).

### Lesson study

The word lesson study was first coined by the Center for Research in Mathematics Education, Khon Kaen University to replace the word "Jugyokenkyu" from Japanese. 'Jugyokenkyu' consists of two words 'jugyo' which means class and 'kenkyu' which means to conduct research (Yoshida, 2004). According to Diop (2014), lesson study is related to an innovative process involving teachers in planning, implementing learning and critical analysis of the implementation as an effort to improve the quality of learning. It provides information on professional development based on assessments of teachers' practice. This goal makes the teacher able to work or understand the lesson, so they can analyze the learning process and contribute to improving student achievement. Meanwhile, Cerbin and Kopp

(2006) say non-study as a system under the command of a broad-based teacher to improve teaching and learning.

In other view, Doig and Groves (2011) say that lesson study seems like a simple idea, where the teacher meets together and then focuses on planning joint learning. This lesson has a focus on developing skills or understanding known as research lessons taught by one teacher and observed by other teachers as well as observers who come from various disciplines. Lesson study in the long run focuses more on behavior or learning. In brief, lesson study can be defined as a process that requires collaboration from a group of teachers to get together to; a) identify learning problems that occur, b) plan the stages in learning to overcome existing problems, c) carry out learning done by one of the teachers that has been agreed upon, while other teachers will observe the course of learning process, d) evaluate learning process, e) improve learning planning based on evaluation results, f) carry out the learning process based on the results of the evaluation, g) evaluate it again to further refine, and h) disseminate the experience and findings of the evaluation results to other teachers.

Lesson study makes teachers able to focus on students and learning because it provides reflective thinking opportunities (Tan & Ling, 2014). It is very useful for improving teaching (Cerbin & Kopp, 2006), enhancing professional abilities (Diop, 2014), and opening teacher awareness in improving teaching and opening strong support from managers (Mon, Yasin & Rahman, 2014). According to Ihsan, Rosli, and Daud (2014), lesson study provides opportunities for the formation of a learning community to improve teacher knowledge and share experiences. In addition, Mondan Meei (2014) states that with lesson study create more thoughts/ more ideas, more interesting, and promotes reflective practice. Inprashita (2009) said that there are seven factors influencing lesson study included school support, manager support, collaboration with outside experts, 4) changing awareness in teachers and students, self-confidence, experience working together, and the emergence of guidelines in knowledge management. Lesson study is commonly implemented in four stages included identification of problems and goals, making learning plans, implementing learning, and reflection (Ikhsan, Rosli, Daud, & Khalid, 2013). According to Cerbin and Kop (2006), the steps of lesson study are formulating learning objectives, designing Research lessons, designing studies, teaching and observing research lessons, repeating the process, and documenting lesson studies. Meanwhile, Inprashita (2014) conveys that the lesson study process is as follows; collaborating to develop planning, using the plan in practice and observing, reflecting, concluding learning that has been done at the end of the semester, and modifying the plan for the next semester Diop (2014) explained the three stages of implementing lesson study included preparing lessons, teaching, observation, discussion and improvement of learning planning, and implementation. Sukirman (2006) also said three stages of lesson study; planning/ plan, do / implementation, and see / reflection.

#### **Lesson study with a scientific approach**

Lesson study scientific approach is used as a means to improve the professional and pedagogical competence of ECE teachers in Batanghari. This activity is carried out by a community of teachers under the guidance of competent experts to improve the practice of using a scientific approach to learning in ECE. The use of a scientific approach in learning is a demand outlined in the 2013 Curriculum. Lessons Study with a scientific approach provides an opportunity for teachers to jointly solve problems related to how to effectively carry out learning with a scientific approach assisted by experts who are competent in the field. Teachers are given the opportunity to observe the learning they

are carrying out and try to understand from the students' perspective.

#### **METHODS**

The design of this study was a qualitative multi-case study of the application of the scientific approach study lessons in two ECEs in Batanghari district. A case study is one of the traditions in qualitative research which is commonly used in education (Erlina et al., 2019; Habibi et al., 2018; Muazza et al., 2019; Situmorang, 2019; Sofwan et al., 2019). Through a qualitative case study, researchers want to focus on the uniqueness of a case that they look at deeply (Mukminin et al., 2017; Rosmiati et al., 2019).

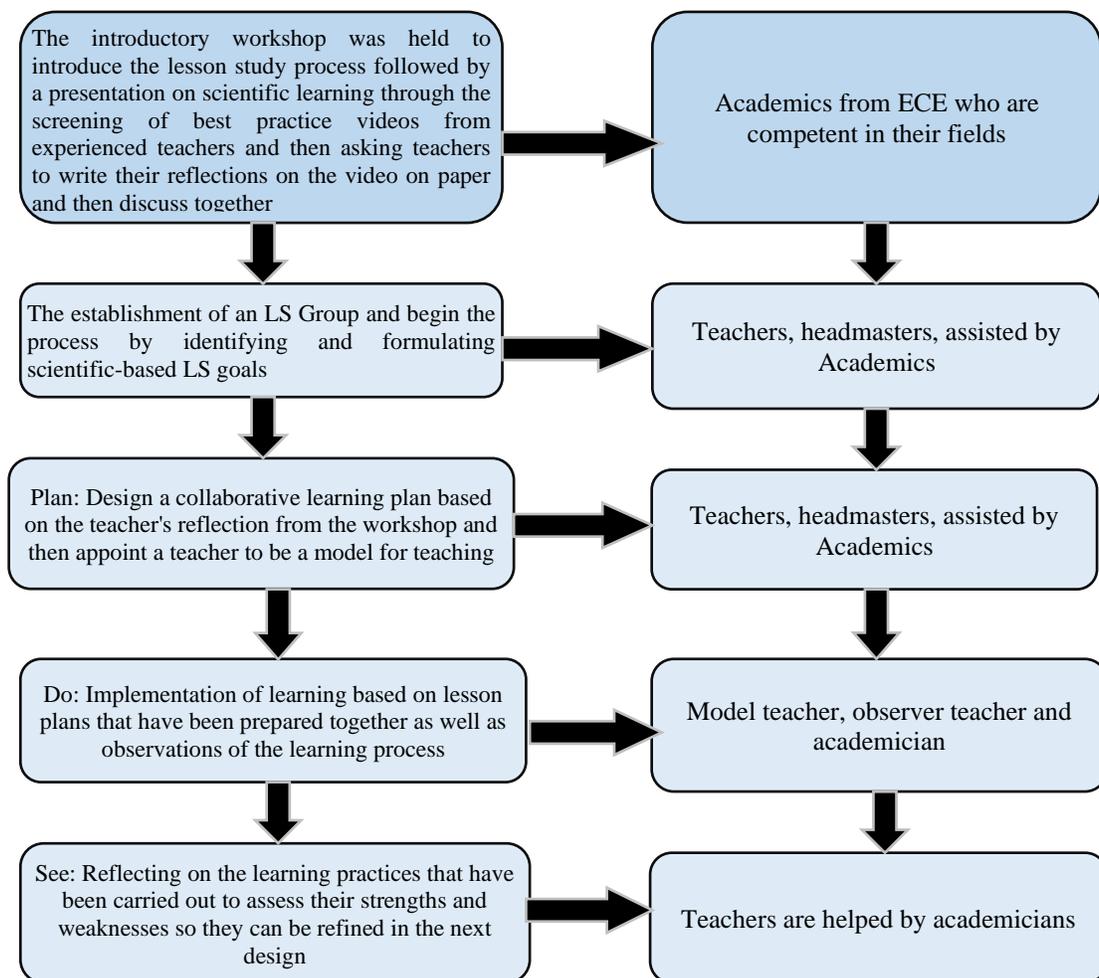
Data were collected from two school principals and ten ECE teachers and involved three academics and ECE resource persons. Data collection used participatory observation techniques, in-depth interviews, and documents. In this study, researchers conducted several participatory observation techniques based on the permission given by the schools. Interviews lasted between 45 and 60 minutes in Indonesian language. Data were analysed through the process of data reduction, data display, and data verification. To guarantee the trustworthiness of the data, this study used extension of participation, perseverance of observation, triangulation, and peers.

#### **FINDINGS**

This study aimed to analyse the implementation of lesson study with a scientific approach to two ECE institutions in Batanghari Regency. Analysis is carried out on the implementation, along with barriers and efforts to overcome them. The lesson study ran smoothly with the help of three expert speakers and ECE practitioners. Before the activity began, a meeting was held for the perception of resource persons on Monday, January 8, 2018, at 3 - 5 at TK Jailananda, Jambi City. This meeting aims to provide an explanation of the lesson study activities, describe the obligations and rights of resource persons, equate perceptions about the implementation of lesson study, and determine the schedule. At the end of the meeting, the three speakers agreed to be presenters at the preliminary workshop, a companion for the preparation of a learning plan (plan), an observer of the implementation of the learning (do), and a companion for reflection (see).

#### **Implementation of lesson study with a scientific approach**

Lesson study scientific approach is carried out by the following stages of the activities listed in Figure 1. Lesson study with a scientific approach begins with an introductory workshop. This activity was held for 2 (two) days, 13 and 14 January 2018 in Hall 2 of STAI Muara Bulian starting at 8 a. m to 4 p.m. Ten kindergarten teachers and 2 school principals attended the workshop. After explaining the purpose of the workshop and the introduction, participants were asked to fill in a questionnaire about involvement in lesson study and a scientific approach. It turned out that all participants admitted that they had never participated in lesson study activities, and only 3 (25%) participants claimed to have applied scientific learning but it was not perfect. Lesson study is new for all participants. They were enthusiastic about paying attention to the explanation given by the speakers. Everyone listened and followed speakers curiously about lesson study and the scientific approach. Their attention was even more focused when the scientific learning best practice video was played. They carefully observed the application of the five-step scientific approach, then they became actively involved in the discussion of reflection and peer-teaching (teaching practices).



**Figure 1 Steps of Scientific-Based Lesson Study 1**

The next stage is to form group study lessons. The formation of the group was carried out on the second day of the workshop, which was

marked by the inauguration of the group and the election of the chairman. After the activity was opened by the guest speaker, the selection of the chair of the lesson study was conducted by acclamation. The result was chosen KS 1 from ECE 1. The elected chairman, in turn, delivered his remarks. In his remarks, the elected chairman stated his commitment and all participants to seriously participate in all lesson study activities. He also expressed his gratitude for being involved in the activity which was held for the first time in Batanghari. He hopes the lesson study activities can provide enlightenment related to learning in ECE. The problem formulation session becomes the next activity. Each participant was asked to write down problems that were often found while being a kindergarten teacher on a piece of paper. The results collected 23 problems classified into five main problems as follows,

1. Determine the right way to deal with problem children (learning disabilities) with various versions of the disorder so that they can be optimally involved in scientific learning)

2. Find the right way to arrange the class to carrying out the scientific process conductively
3. Find ways to make support and determine the right learning media in carrying out scientific learning
4. Improve teacher's pedagogical and professional competence in carrying out scientific learning
5. Determine ways to get optimal support from parents as the school's main partner in carrying out scientific learning.

These problems look for solutions through plan, do, and see activities in cycle I and cycle II. The Plan Phase is designing a collaborative learning plan. Planning is directed to be a solution to the problems faced by teachers around handling children, class management, teaching strategies, and parent-teacher relationships. From the brainstorming activities in the first cycle, it was agreed to choose a work theme and doctor's sub-theme, using the role playing center including ambulance driver, inpatient room, operating room, kitchen and laundry, examination room and dental clinic, reception room, emergency room, emergency room, pharmacy room, waiting room, prayer room, and ATM room. Everything is arranged in a learning plan with the layout of the room arranged in Figure 2.

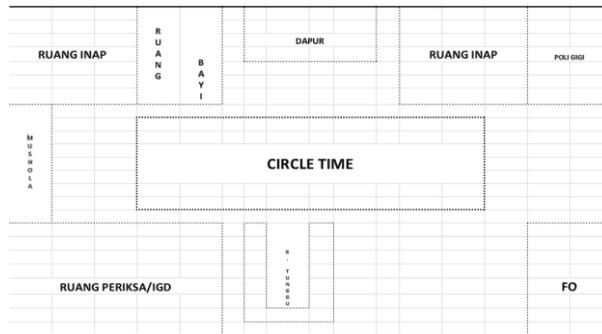


Figure 2. Lay Out the Study Room

Preparation of learning plans is the application of pedagogic and professional competencies. At this stage, all participants (principals and teachers) and academics are fully involved so that a Daily Learning Implementation Plan (DLIP) is available and ready to be practiced by the model teacher at the *Do*. Stages of *Do* are carried out in each school on a different schedule. Scientific learning is carried out by a model teacher and two co-teachers with 28 students. Before the implementation of learning, the group leader conducts a brief meeting to remind the teacher to carry out the learning in accordance with the DLIP that has been prepared. The observers were also reminded not to interfere with learning activities. ECE 1 and ECE 2 teachers try to arrange the room and carry out learning according to DLIP. The room is arranged neatly according to the layout that has been arranged. Each activity room is limited by a locker rack. The model teacher and the accompanying teacher were serious about carrying out scientific learning activities starting with motor development activities outside the classroom, and continued with preliminary activities, core activities, and indoor closing activities. Although using the same plan, the implementation shows variations.

The motor activities in ECE I are in the form of a teacher's example accompanied by the song 'Aku Anak Sehat'. After cooling down, continue activities while climbing the board and hanging. In ECE 2, motor activity begins with greetings, reading two sentences of *Syahadat* and *Iqrar*. Next, the children followed the teachers' movements which were accompanied by several children's songs. After cooling down, continue by walking on the boardwalk and jump over the tires arranged in the yard. The last activity is Toilet Training. In class, the teacher acts as a facilitator and motivator. ECE 1 children seemed to enjoy their role more, no empty rooms were found, all filled. Children play their roles according to their experiences, without teacher's guidance. On the other hand, ECE 2 children look stiff, scared, and always waiting for instructions from the teacher. In the closing activity, not all children get the opportunity to share their play experiences due to time constraints. The teacher also does not carry out an assessment of the development of students. The see or reflection phase is an activity providing responses to learning. The model teacher, accompanying teacher, and resource persons convey the advantages and disadvantages of learning.

Both model teachers expressed their feelings and barriers they faced. Even though the language is different, the meaning is the same. They feel happy, more comfortable, and easier to carry out learning based on jointly arranged scenarios. On the other hand, there is also feeling nervous and confused because it is under the observation of a colleague. They claimed they were not satisfied and wanted to try again. They feel that lesson study is more useful than ordinary training because the material learned is directly practiced and given feedback so that further improvements can be made. The teachers claimed to experience barriers in managing the class. There are too many students; the classrooms are too small so that children's activities are limited.

On the other hand, teachers also have difficulty coping with overactive children, coupled with the lack of media and the lack of teacher experience.

Reflections from observers in this study are related to handling children, classroom management, support and media, scientific approaches, and parental support. In general, the observers saw that the teacher had shown maximum effort, although there were a number of shortcomings. In both ECEs, there are still children who are passive, play outside the concept, and run around, then this needs to be addressed. Classroom arrangements that need improvement are empty roles, lighting, and student guidance. With regard to media and facilities, the boardwalk is doubtful about its safety, as well as the lack of explanation about friends and the function of the tool. The application of competencies that needs to be improved is in terms of encouraging children to ask questions, providing reinforcement, and making an assessment. The reflection of the resource person also deals with five aspects. First, the handling of children is good enough, there is only a kind of labelling 'not focused' on song lyrics, the teacher only focuses on the class and ignores outside the classroom, and the explanation of the rules of the game is not strong. Classroom management has been carried out in earnest, but the narrow space limits the child's movements. Regarding strategy, the resource person noted that the teacher had followed the scenario, only the teachers were sometimes motivated to be more dominant so that the children did not explore on their own. There are still many shortcomings in the scientific approach, especially in terms of the use of the five senses, the opportunity to ask and answer, and communicate. Finally, the learning tools are considered very complete and even considered excessive so it is feared that it can harm the child (such as syringes).

The implementation of learning with a scientific approach in the first cycle has not been convinced by 2 teachers in ECE I and ECE 2. They feel the need to try again to better understand the implementation of lesson study. For this reason, the second cycle was carried out and intended to see the diversity of lesson study with a scientific approach. The Cycle 2 Plan activities took place on Wednesday 28 April 2018, at 1.30 - 5 p.m, at the STAI Muara Bulian classroom. Learning planning is prepared by paying attention to the reflection of cycle 1. All participants in the study follow the activity and actively provide input. In plan activities, it was agreed to keep using the previous format, children in the class were reduced to 15 students. The theme of learning is fruit, learning focuses on literacy such as introducing letters (Jj, Pp, and Aa) with the concept of numbers, sizes, volumes, textures, colors, relationships, tastes, addition and subtraction.

The *Do* phase in cycle 2 shows a change towards improvement in both ECE. Both ECEs have prepared the learning environment according to the lesson plan. The environmental footing is seen at the center of preparation in the form of imitating letters, classifying objects, collages, mystery letters, classifying objects, making albums, and weighing objects. Activities in ECE 1 began by lining up in the yard followed by applause, asking for the day, month and year (pat day), Good Morning songs, and gymnastics

accompanied by music. After that, the children play *yeye* rubber. Two children hold rubber and the others skip the rubber. All children play alternately with enthusiasm. The activity was closed with toilet training. In class, the activity began by sitting in a circle on the floor to provide a footing before playing. When playing, teachers pay attention to children and provide assistance if needed. The children seemed to enjoy the game and the average child completed 4 activities.

ECE 2 also did the same thing. The teacher seemed eager to give examples of motor movements accompanied by music. The teacher seems to have understood how to apply a scientific approach. The teacher tries to apply what they have gotten to the lesson study they have followed. Hence, it is with students. Children are motivated by the learning activities carried out. Educational play tools are able to stimulate children to observe with five senses, ask questions, gather information, reason, and recall children can tell about their play experiences. One of them is due to the number of children served according to national standards. The reflection phase is carried out immediately after learning. Both teachers expressed that they were extremely happy and satisfied even though there was a feeling of imperfection. They admit they are still stiff because they are not used to it. ECE 1 teachers stated that they were constrained in regulating sound, and ECE 2 teachers were constrained in seeing children who were still stiff in playing. With increasing understanding plus continuous practice, scientific learning in ECE will be fun for teachers and children. The observer expressed a similar reflection with the model teacher. They see aspects of child handling, classroom management, provision of support, and pedagogical and professional teacher competencies. Some notes need to be considered relate to the selection of banana media that cannot be eaten by children and not responding to children's responses. The resource person also confirmed that there had been an increase in the five aspects observed (child handlers, class enhancements, learning strategies, synthetic approaches, and providing support). The point of concern is that there are still stiffs and doubts both from the teacher and from the child. Need training on an ongoing basis to become a habit.

#### **Barriers faced in the implementation of lesson study**

The implementation of lesson study, in general, found two obstacles. The first barrier relates to time. Participants and resource persons have different work schedules. Lesson study activities are expected not to make participants leave their teaching assignments in ECE. This makes it difficult to find the right time to gather between the participating teacher, resource person, and researcher, as the following resource persons revealed,

All of us, participants, resource persons, and even the researchers themselves, have difficulty in determining the meeting schedule for this lesson study activity. (R3).

The second barrier relates to place. The classrooms of each school are not yet sufficient to be used as learning spaces that facilitate the process of observation and recording. It is difficult to find a comfortable position for observers to monitor the whole class while not disturbing the learning process, as a participant conveyed as follows,

The constraints in terms of place, the available classrooms in each institution are inadequate, making it difficult to position observers. (R2).

#### **Attempts to resolve barriers**

To overcome barriers or solve problems encountered, several efforts are expected to be effective. The first and foremost effort is to strengthen mutual commitment to improve learning practices so far. The principals and teachers were touched by their sense of responsibility to carry out special learning in order

to develop all the potential of their students. For this reason, they are committed to taking part in the whole series of lesson study activities. With high commitment, the participants ignored other activities for their participation in lesson study activities. Following are the answers of several respondents when asked about the efforts made to overcome the problem of time.

In terms of following this lesson study, because from the beginning it has been stated that it is willing to take part in activities from the beginning to the end, such matters are not incidental in nature and can be minimized. (KS 1)

Matching time is indeed an obstacle, but it can be overcome because it realizes the main purpose of following this lesson study. (R.1)

Joining the lesson study is one's own volition, so whatever the collective agreement is, try to adjust it to other interests. (T.4)

The second attempt is aimed at overcoming the place constraints. In order to provide a comfortable place for students and lesson study observers, collaboration with Higher Education, BP PAUD (Development Center for early childhood education) and DIKMAS (community education), the Office of Education and Culture, and partnership organizations. The principal when interviewed as quoted below stated this,

If the current conditions are with many observers, it is indeed difficult to take a position when making observations. For this reason, cooperation with the local department and BP PAUD and DIKMAS is needed (KS.1)

Yes, it can work together with HIMPAUDI, IGTKI and IGRA (KS.2)

For the place, indeed every institution in Batang Hari, on average with the same form of building, needs to work together with, one of them is a college or university. (KS.3)

#### **DISCUSSIONS**

This study examined the implementation of lesson study with a scientific approach to Early Childhood Education (ECE) in Batanghari Regency. The research findings, in general, showed that lesson study can be carried out in an effort to improve the learning of ECE teachers. This finding showed that lesson study can be used to improve the role and concern of teachers for the quality of continuous learning. This is consistent with the statement of Diop (2014) that lesson study is an innovative process that involves teachers in planning, implementing learning, and critical analysis to improve the quality of learning. Improved learning quality is also seen in children. Gradually, learning makes children actively engage all of their five senses to do 5 process. In this way, children build their own knowledge through the experience gained (Piaget, 2009).

The findings of this study complement the evidence that lesson study is a model that can build pedagogical knowledge and improve teaching as proposed by Cerbin and Kopp (2006). Muammar and Zahara (2014) proved that lesson study at tertiary institutions can improve teaching and learning processes and students learn effectively. Suratno, Ni'mah, Zulkifly, and Nur'aini (2009) noted that lesson study enhances teacher conceptions about teaching, teaching tools focused on student learning processes, teacher capacity, and elementary school student responses. Thus, lesson study can be used in elementary schools, secondary schools, and tertiary institutions, and this study completed it with its application in ECE.

#### **CONCLUSIONS AND RECOMMENDATIONS/ IMPLICATIONS**

Lesson study with a scientific approach can be applied to ECE teachers. Lesson Study activities begin with an introductory workshop, formation of study groups, followed by *Plan, Do* and *See* activities. Lesson Study is carried out in 2 cycles, with the aim to see the diversity of the implementation of lesson study with a scientific approach to early childhood learning. Although they

use the same plan, learning in each institution shows a unique nuance. One thing in common is that lesson study can improve teacher understanding in carrying out early childhood learning with a scientific approach, including in terms of handling children, setting class, providing support, as well as determining the right media. There has also been an increase in children's activity in terms of observing, questioning, gathering information, reasoning and communicating. The application of lesson study to this scientific approach is able to create an atmosphere conducive to the creation of an atmosphere of mutual learning between participants. Barriers faced in the implementation of lesson study activities included the difficulty of finding the right time for teachers and resource persons, and the difficulty of a comfortable place for observers because physically the classroom buildings in ECE institutions are not designed for research sites.

Efforts to overcome barriers in implementing this lesson study are to strengthen and always remind commitment to improve learning. The participants are required to always hold commitments and put aside other things that are not too important. The next effort undertaken is by collaborating with Universities, BP PAUD and DIKAMS, the Office of Education and Culture, and partnership organizations such as IGTKI, HIMPAUDI, IGRA to get a place so observations can be optimally carried out. Furthermore, the application of lesson study also has an impact on students, including fostering children's stimuli and interests in learning, optimizing children's exploration through the five senses, and improving the 5 process (observing, asking questions, gathering information, reasoning and communicating). Thus, making early childhood learning quality in accordance with the principles of early childhood learning and stages of child development is important.

The findings of the study can be submitted several suggestions. First, it is suggested to related parties, such as the Ministry of Education and Culture, BP PAUD and DIKAMS, Higher Education and partnership organizations (HIMPAUDI, IGTKI and IGRA), to form lesson study groups in collaboration with competent resource persons. Second, it is recommended to ECE institutions, especially teachers and principals to implement lesson study as an activity to find solutions and solve learning problems in ECE, including the problem of increasing children's literacy skills which are basic skills in dealing with the 21st century. Third, it is suggested to the next researchers to conduct case study or other approaches in qualitative research in other ECE institutions to get a comparison, and or experimental research to measure how much increased competency is gained by ECE teachers regarding the implementation of lesson study with a scientific approach.

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#### CONFLICT OF INTEREST

No potential conflict of interest was reported by the author.

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